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Our Universities: Research and Resources

Sixth in the series, Follow the money

Research produces knowledge that changes the world. Its value, for the often slow result of careful investigation, is both difficult to forecast and impossible to calibrate.

For, behind the scenes, halfway around the world in Mexico, were two decades of aggressive research on wheat that not only enabled Mexico to become self-sufficient with respect to wheat production but also paved the way to rapid increase in its production in other countries.

Norman Borlaug, 1914 – 2009, Texas A&M University Distinguished Professor of International Agriculture, Eugene Butler Endowed Chair in Agricultural Biotechnology

Investments in research and scholarship help create academic excellence and fuel economic development in the private sector.

In 2010, Johns Hopkins, the most abundantly funded research university in the world, topped \$2 billion in all research and development expenditures. Over \$1.7 billion came from the federal government and the rest from state and local government, business, nonprofits, and institutional funds. In total, the funding from all sources, at all universities in our nation, is about \$62.5 billion dollars.

At the other end of the spectrum, with a rank of 741 out of 741, Pennsylvania State University, Worthington – Scranton, expended a more modest \$152,000 for research and development of which \$149,000 came from the state government and \$3,000 from institution funds.

There has been powerful growth in research funding from all sources. In 1953, according to NSF, federal research funding was \$255 million. It increased to over \$1 billion in the next decade...had to get ahead of Sputnik. By 1973, it was almost \$3 billion...needed the lunar backdrop for Neil Armstrong's famous utterance, "That's one small step for man, one giant leap for mankind."

Well-executed university research has a positive impact on academics and the student experience. *"Undergraduate Teaching and Learning in Physical Geography,"* June 2012, by Terence Day in *Progress in Physical Geography*, claims there is no negative correlation between good teaching and active engagement in research and scholarship.

In fact, the opposite may be true and there is some positive relationship between teaching quality and scholarly and creative work of faculty members. To argue that research universities neglect teaching does not hold water but makes good sound bites

for apologizing for poor teaching, even when unaccompanied by research. Experience shows that good scholars are also good teachers.

Whether by the truckload or teaspoonful scholarship and research “leavens” teaching and learning, both at Johns Hopkins and Pennsylvania State University Worthington – Scranton. Thoughtful investigation creates a scholarly culture.

Beyond the impact of teaching is the economic impact of funding research at universities. For example: 4,000 MIT related companies employ 1.1 million people and have annual world sales of \$232 billion according to Jonathan Cole, quoted in the recent National Science Foundation report, *Research Universities and the Future of America*. MIT is a private university with 150 years of research activity. But the University of Alabama, Birmingham, has a \$4.6 billion economic impact on Birmingham and provides 61,205 jobs according to the NSF report, and it is only 75 years old, an “adolescent” public institution in academic terms.

There are dark clouds on the horizon. Cuts in funding are dramatic in some states. Alaska is at the top of the list with a 49% reduction in state support, and Vermont and Washington, hovering at a 10% reduction expressed as a share of the state GDP in the five-year period from 2003 to 2008, forewarn of a disturbing drift. State resource streams for R&D, once torrents, are now trickles.

The reduction from state support telegraphs to the national arena where federal investment was .24% of our GDP in 2008, while world averages were at .34% of GDP. In real dollars, the U.S. still has a significant commitment, but other nations like Ireland, Korea, and China are increasingly investing in R&D at rates that have increased over 100% in the past five years, according to a May 2011 **Information Technology & Innovation Foundation** report by Robert Atkinson and Luke Stewart. U.S. investment has gone up about 10%. Business and industry-funded research follow roughly the same pattern: The U.S. is lagging over the same period with a slight decline in privately funded research.

In our universities, the flow of resources for research is a clear indicator of academic quality, while it stimulates entrepreneurship for economic development, yet another value added to the academic experience of our students.

False dichotomies between research and teaching are just that. The culture of inquisitiveness lives in the Petri dish of scholarship and creative work and provides the possibility of mission-defined academic excellence at every institution.